Octorber, 03, 2005

Dear Dr.Arias, BIPM,

Attached is the report on the frequency measurement by NMIJ-F1, a cesium atomic fountain frequency standard of NMIJ, during MJD 53629-53639. The uncertainty evaluation procedure was the same as that in the last report.

Sincerely yours,

Time Standards Section, Time and Frequency Division,
National Metrology Institute of Japan (NMIJ) / AIST,
AIST Tsukuba Central 3, Tsukuba-Shi, Ibaraki-Ken 305-8563, Japan

Frequency comparison between H-Maser(405014) and Cs Fountain (NMIJ-F1) during **MJD 53629-53639**.

We have measured the frequency of our Hydrogen maser HM (Clock # 405014) using NMIJ-F1 during **MJD 53629-53639**. The results are shown in Table 1.

Period	**53629-53639**
Measurement ratio	94.1 %
Y(NMIJ-F1)-Y(Maser 405014)	24.7
u_A	1.1
u_B	4.2
$u_{link\ /\ lab}$	0.5

Table 1. Results of the comparison in $1\text{x}10^{-15}$ unit.

The uncertainty budgets are shown in Table 2.

Effect	Bias	Uncertainty
2nd order Zeeman	182.1	2.1
Blackbody radiation	-17.2	0.9
Gravitation	1.6	0.1
Cold collisions	0.0	3.3
Distributed cavity phase	-	1.2
Total	166.5	4.2

Table 2. Frequency biases and uncertainties in NMIJ-F1 in 1×10^{-15} unit.

The uncertainty of the link in the laboratory, $u_{link\ /\ lab}$, is written as,

$$u_{link\ /\ lab} = \sqrt{u_{dead\ time}{}^2 + u_{link\ /\ maser}{}^2},$$

where $u_{link\ /\ maser}$ is the uncertainty due to the noise of the phase comparator between the fountain and HM-1, $u_{dead\ time}$ is the uncertainty due to the operational dead time of the fountain. The operational efficiency of NMIJ-F1 was 94.1 %. The resulting uncertainty contributing to $u_{link\,/\,lab}$ is shown in Table 3.

	Uncertainty
$u_{link\,/\,maser}$	0.5
$u_{dead\ time}$	0.2

Table 3. Uncertainty is expressed in 1×10^{-15} unit

The type B uncertainty of the 2nd order Zeeman shift has been re-evaluated, so the resultant bias and uncertainty in Table 2 are different from those in the last report.